

Application No. 10/539,005
AMENDMENT dated October 14, 2009
Reply to Office Action of May 14, 2009

AMENDMENTS TO THE SPECIFICATION

On page 1 of the Specification, after the title, please insert the following new section:

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a U.S. national phase application filed under 35 U.S.C. § 371 of International Application PCT/SE03/01736, filed on November 11, 2003, designating the United States, which claims priority from Sweden Application 0203756-2, filed on December 17, 2002.

On page 1 of the Specification, before the paragraph beginning on line 4, please insert the following new section heading:

FIELD

On page 1 of the Specification, before the paragraph beginning on line 14, please insert the following new section heading:

BACKGROUND

On page 1 of the Specification, please replace the paragraph beginning on line 27 with the following amended paragraph:

In connection with control and monitoring systems of this type, there is an on-going need to make the system as such more efficient, to improve it and to make it cheaper. A bottleneck for system performance is the bandwidth of the bus. To date, most systems based on CAN have been constructed on the basis that messages are sent event-driven. This means that the bus is poorly utilized and that the time for message transfer varies greatly. This fact has resulted in CAN generally being considered to be unsuitable for safety-critical systems. Such systems should be based on time-controlled scheduling of message transfers between the nodes in the system. Special protocols for this have been developed, for example TTP and Flexray. A new standard for CAN with support for time scheduling is in preparation by ISO ("Controller area network (CAN) B Part 4: Time-triggered communication" ISO/CD 11898-4) which proposes

how CAN messages can be time scheduled and how clocks for this can be arranged. An overview and discussion of the subject is published in the publication IEEE Micro July-August 2002. TTP can be considered best to correspond to the current technology concerning distributed systems with high real-time and security requirements. This is a modern, advanced and well-documented protocol for time-controlled systems that are used in vessels. For detailed information, refer for example to H. Kopetz, "TTP/C Protocol", TTTech 1999 that is available at <http://www.ttpforum.org> ~~www dot ttpforum dot org~~. A study of TTP/C shows that it makes high demands to the effect that the clocks in the respective modules must operate within a high given tolerance and that special circuits must be used, so-called Bus Guardians, in order to ensure that no module transmits messages that collide with other messages on the bus. In general, serial protocols are divided into three classifications: Collision Avoidance (CA), Collision Detection (CD) and Collision Resolution (CR). Definitions of the classifications and the boundaries between them can vary. TTP is a typical CA protocol, that is all measures and steps are taken in order to avoid collisions. This is a generally accepted starting point for traditional time-controlled systems. The Ethernet is a good example of a CD protocol. Collisions normally arise on the bus and are detected. Colliding messages are discarded and the transmitters send the messages again after a delay. The protocol has rules concerning this delay so that at least the modules that collided do not immediately collide again. The collisions thus give rise to reduced bandwidth and mean that the maximum delay for a given message can not be calculated and guaranteed. CAN is an example of a CR protocol. Collisions are resolved in a predictable way. The price of this characteristic is a low maximum bandwidth and this is one of the reasons that CAN has been considered not to be a suitable protocol for time-controlled systems. In addition, the collision-resolving characteristic has been considered by most experts not to be of value for time-controlled systems, as collisions are not supposed to occur.

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On page 4 of the Specification, before the paragraph beginning on line 40, please insert the following new section heading:

SUMMARY

On page 12 of the Specification, before the paragraph beginning on line 7, please insert the following new section heading:

BRIEF DESCRIPTION OF THE DRAWINGS

On page 13 of the Specification, before the paragraph beginning on line 22, please insert the following new section heading:

DETAILED DESCRIPTION